

## Overview of « Equatorial Port Plug 01 » assembly

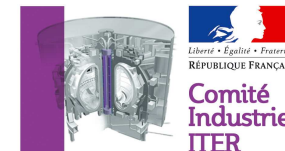
**Assembly Workshop**

**MARTINS Jean-Pierre**



Nice • France  
10-12 December 2007  
Acropolis Congress Centre

# Overview of « Equatorial Port Plug 01 » assembly



## ➤ Overview

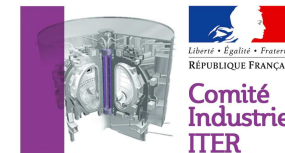
- General layout of the ITER Tokamak
- Description of the Diagnostic Equatorial Port Plug 01

## ➤ Assembly phases along the project

- Before final installation in tokamak
- Installation in ITER and lifecycle

## ➤ Conclusion

# Overview of « Equatorial Port Plug 01 » assembly



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- General layout of the ITER Tokamak
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## Assembly phases along the project

- Before final installation in tokamak
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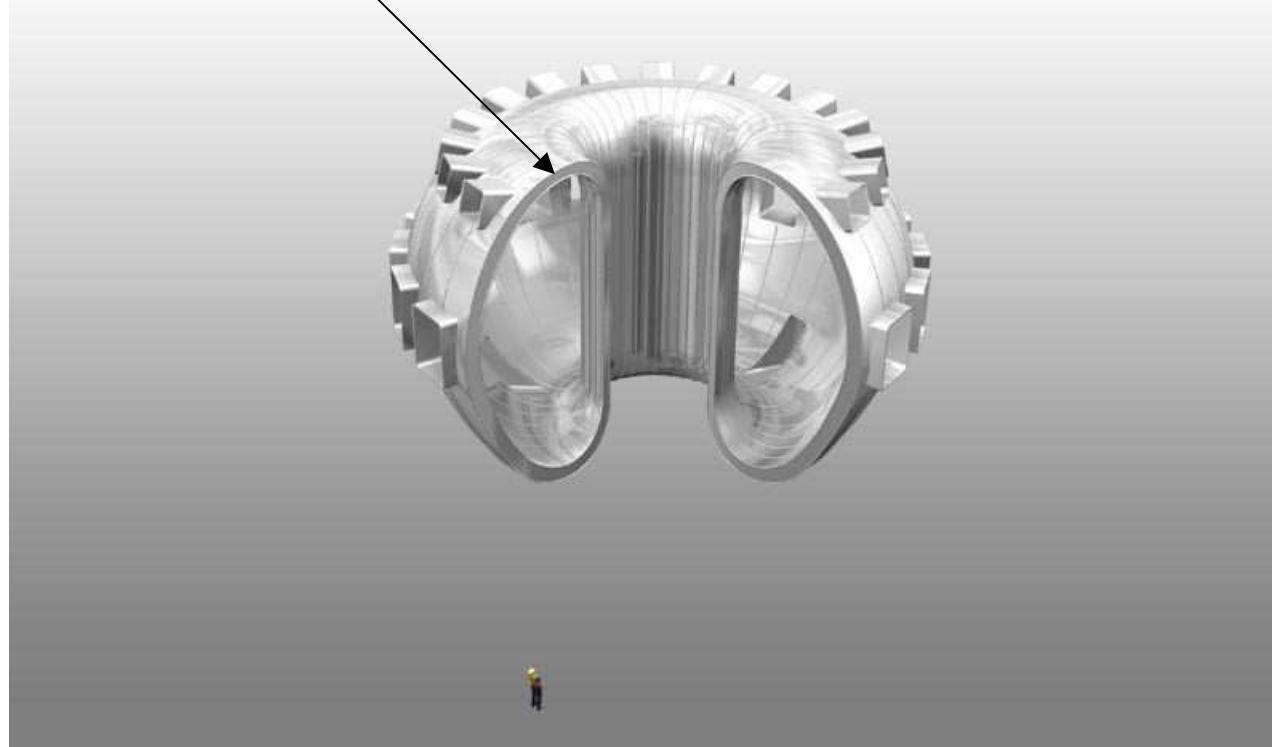


## Conclusion

## Overview

# General layout of the ITER Tokamak

*Vacuum Vessel  
9 sectors*

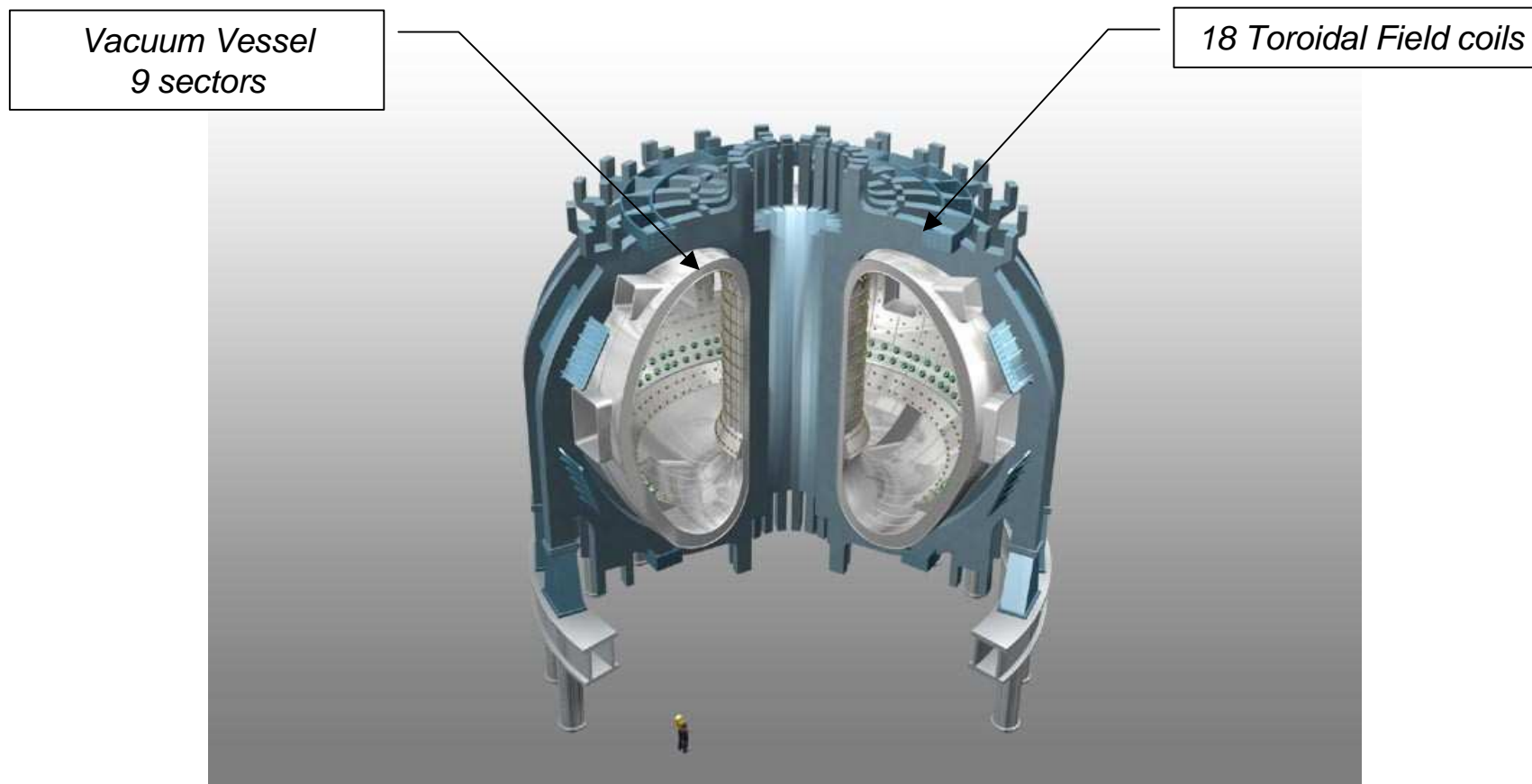


***ITER main components***



## Overview

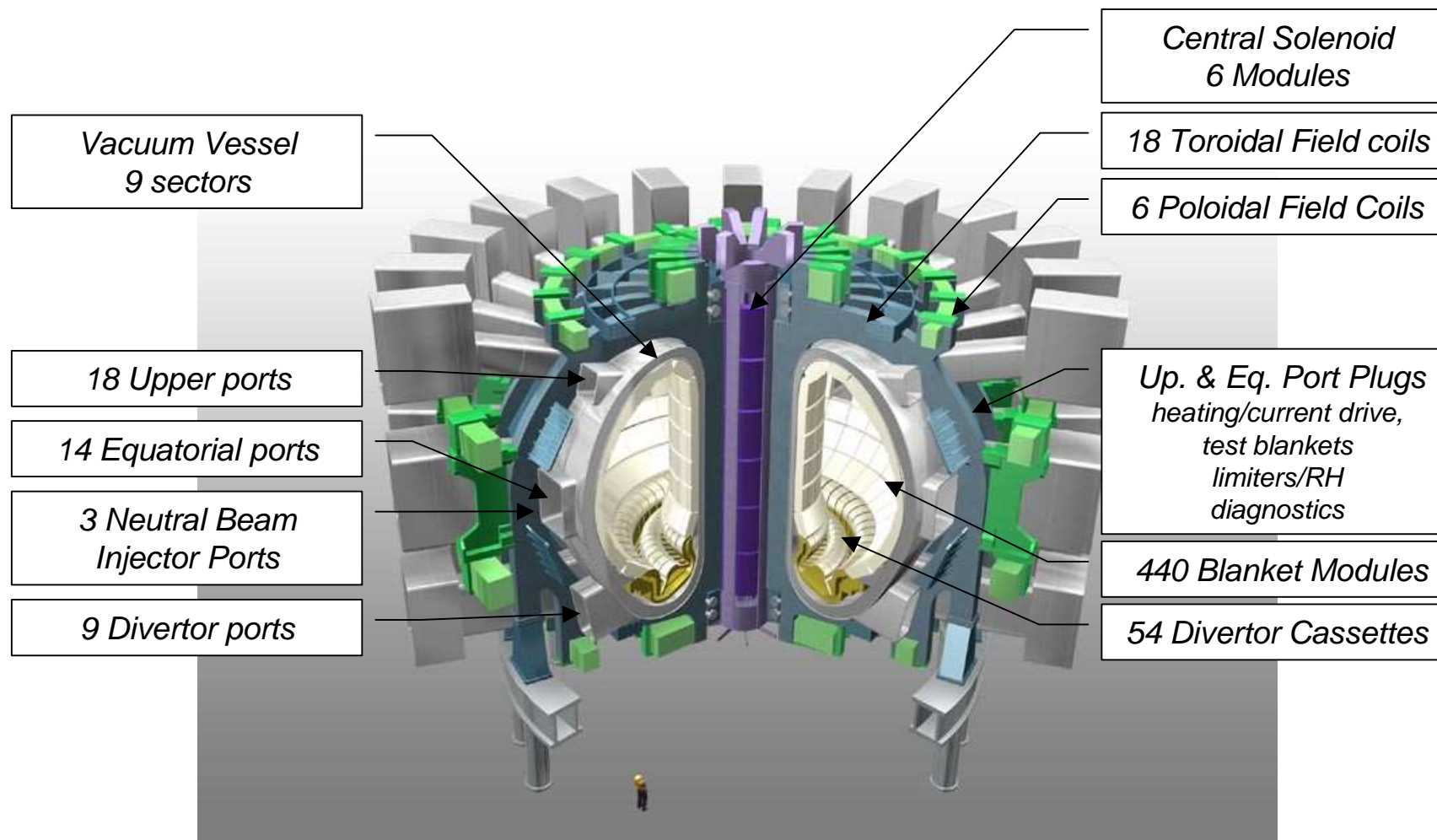
# General layout of the ITER Tokamak



***ITER main components***

# Overview

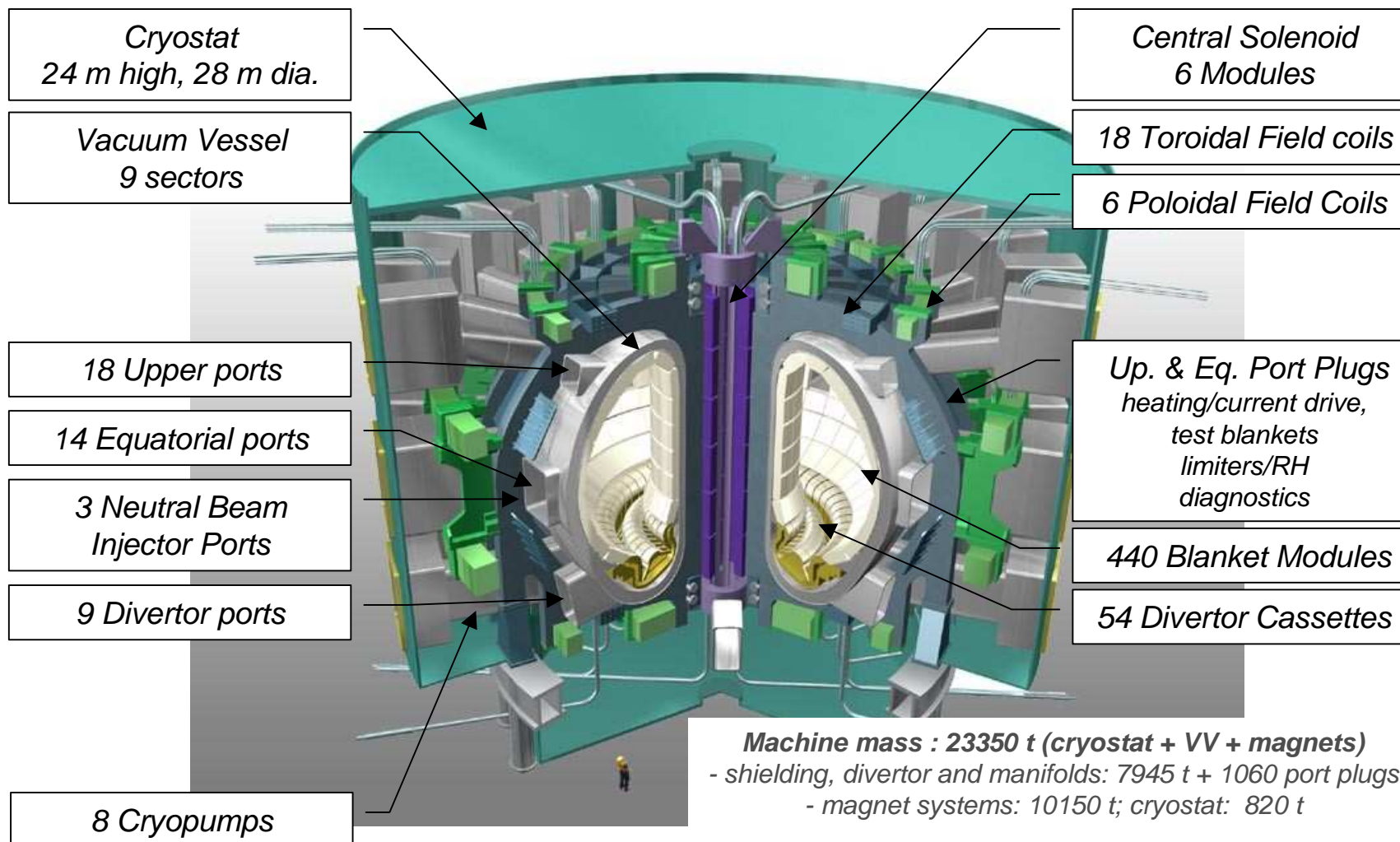
## General layout of the ITER Tokamak



**ITER main components**

## Overview

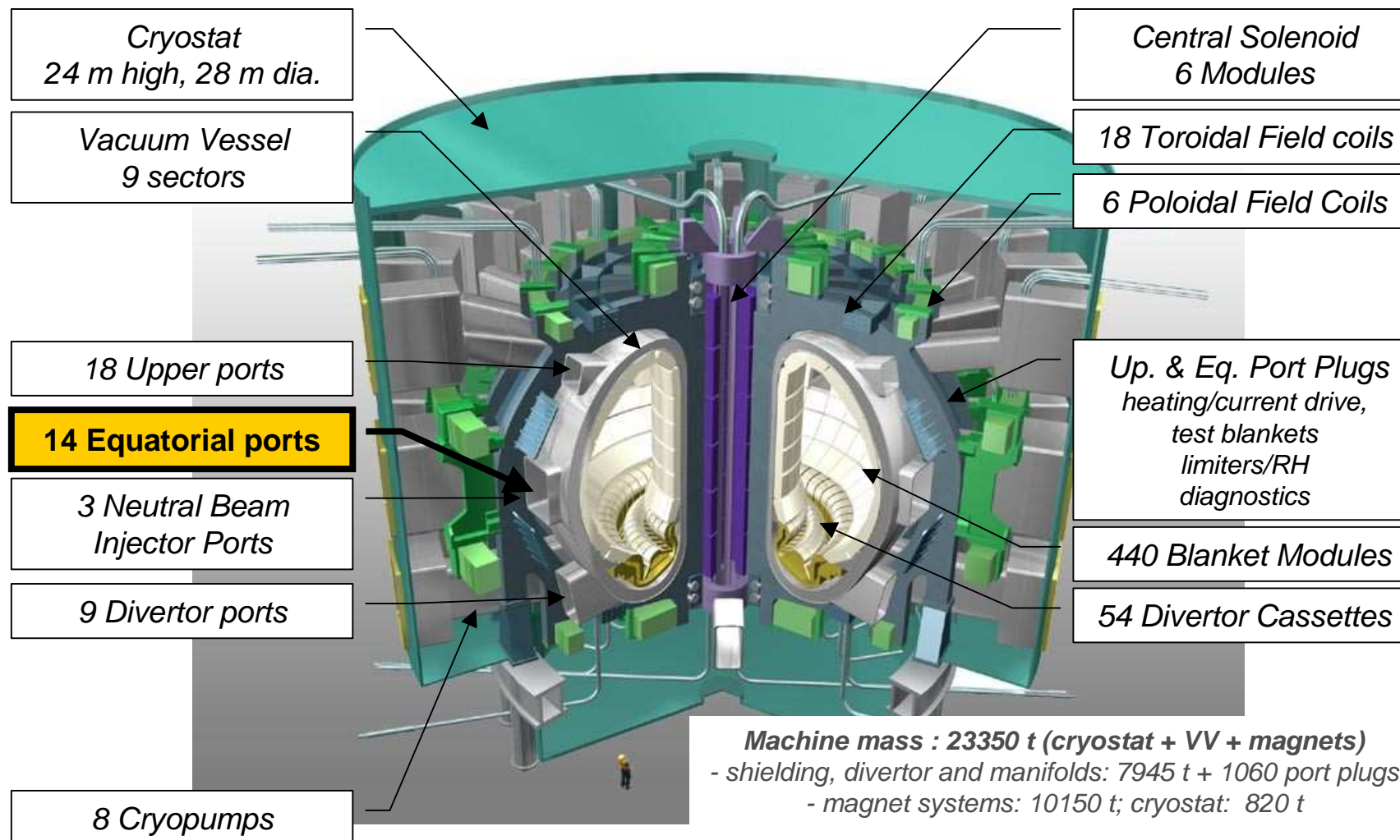
### General layout of the ITER Tokamak



**ITER main components**

## Overview

# General layout of the ITER Tokamak

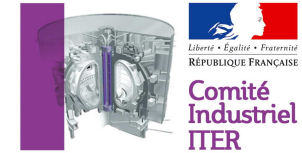


**ITER main components**

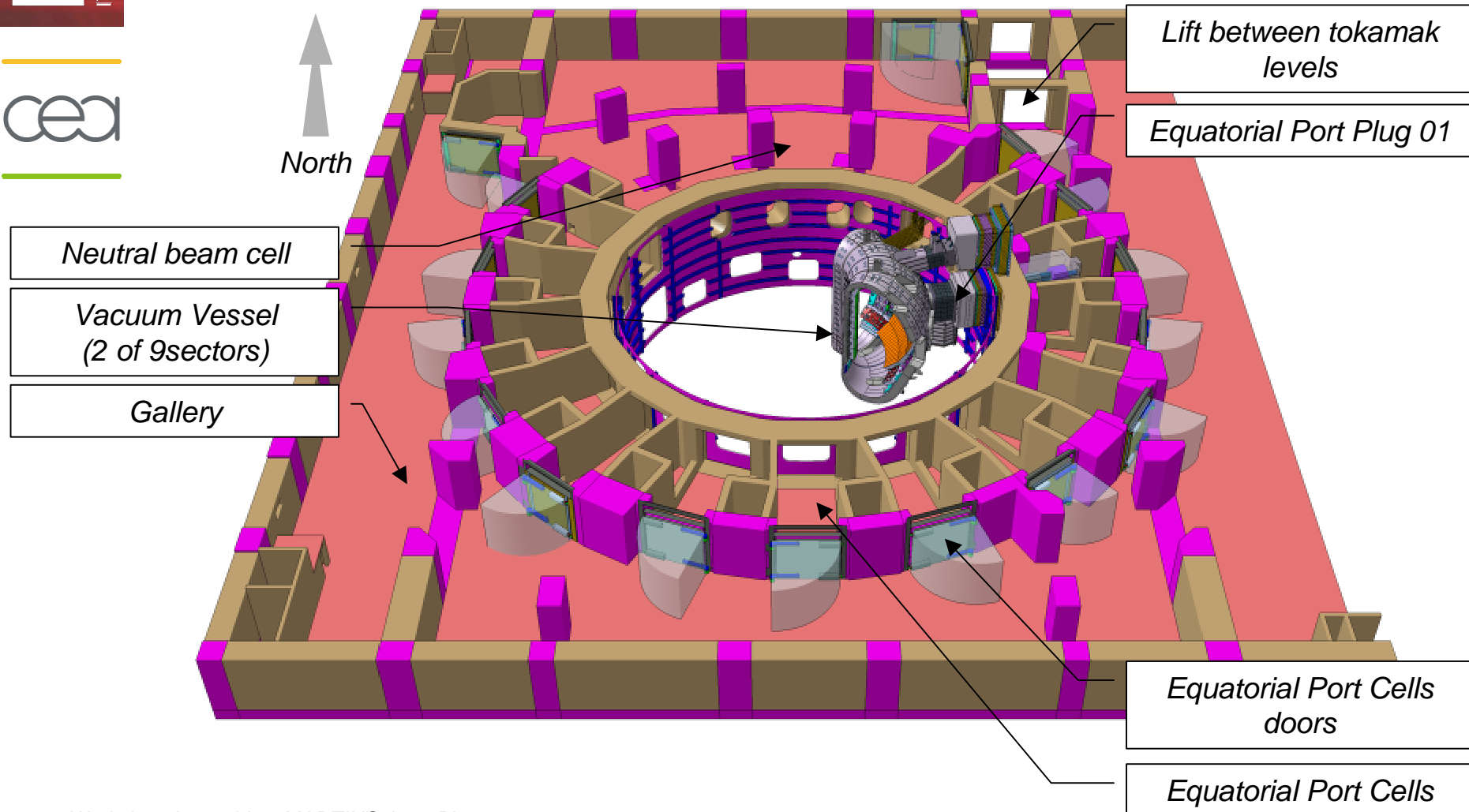


## Overview

### Description of the Diagnostic Equatorial Port Plug 01



#### Location in the tokamak building – Equatorial level

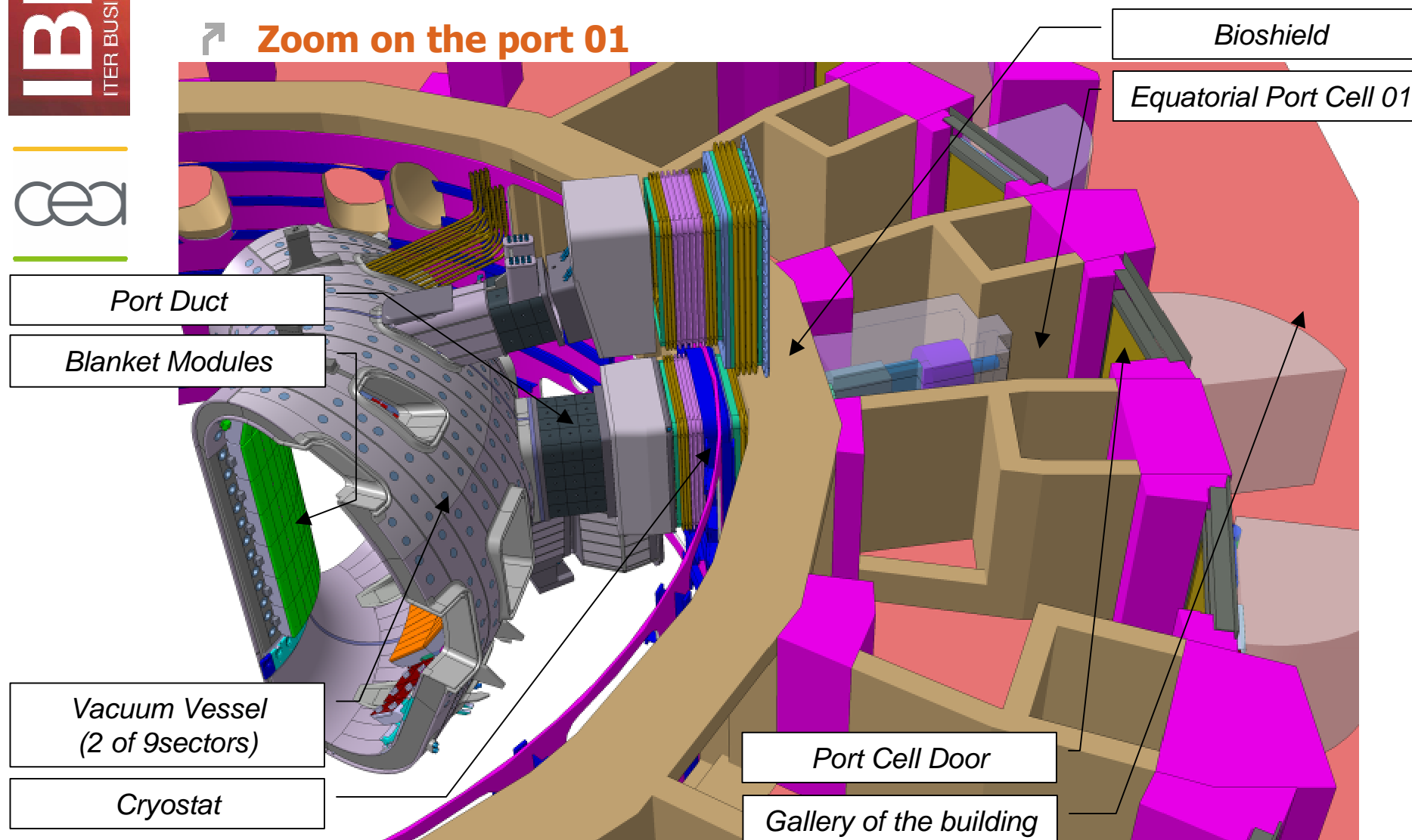


## Overview

### Description of the Diagnostic Equatorial Port Plug 01



➤ **Zoom on the port 01**



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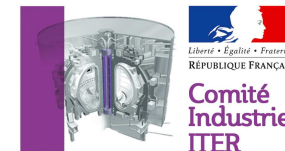
➤ **Zoom on the port 01**



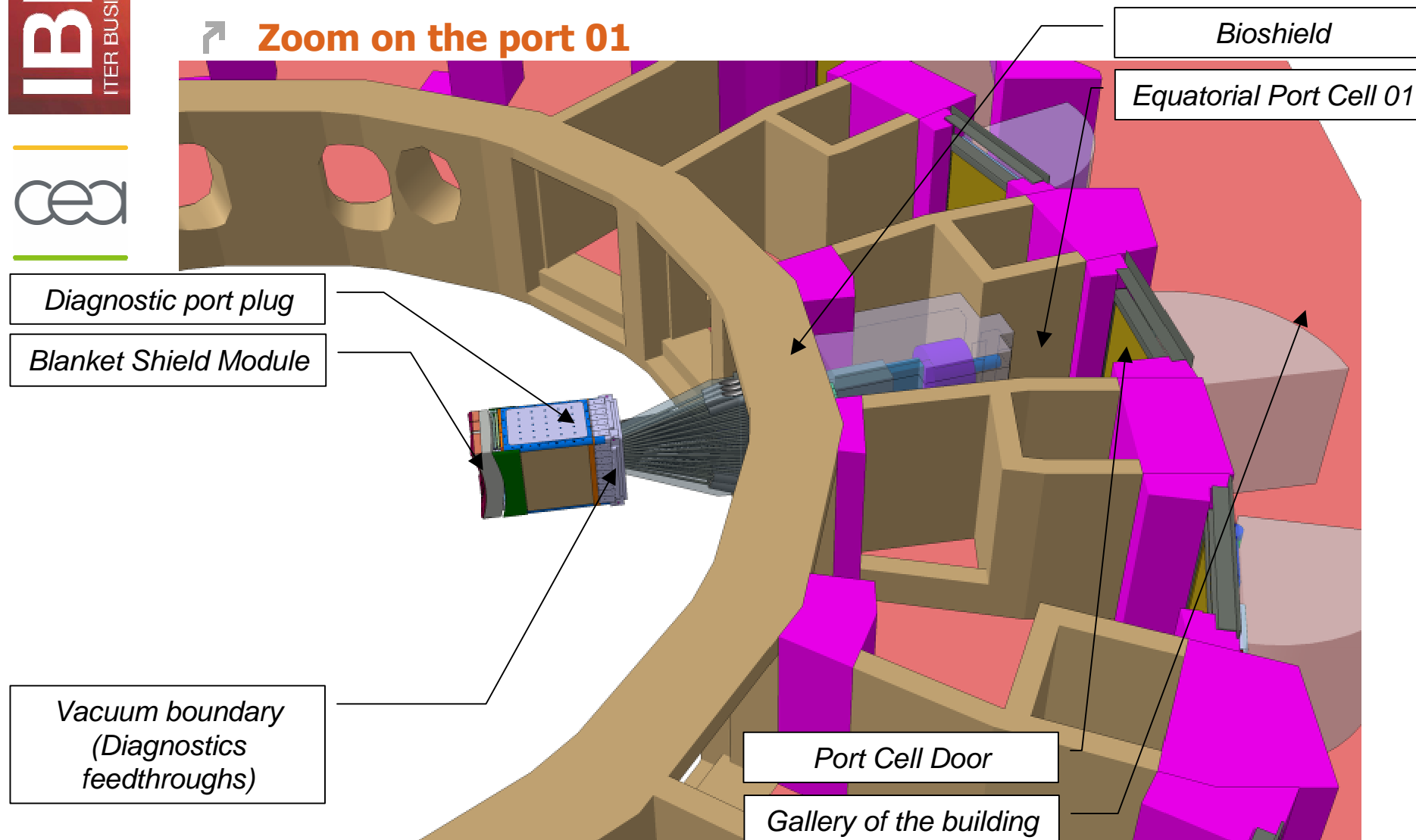


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### Description of the Diagnostic Equatorial Port Plug 01



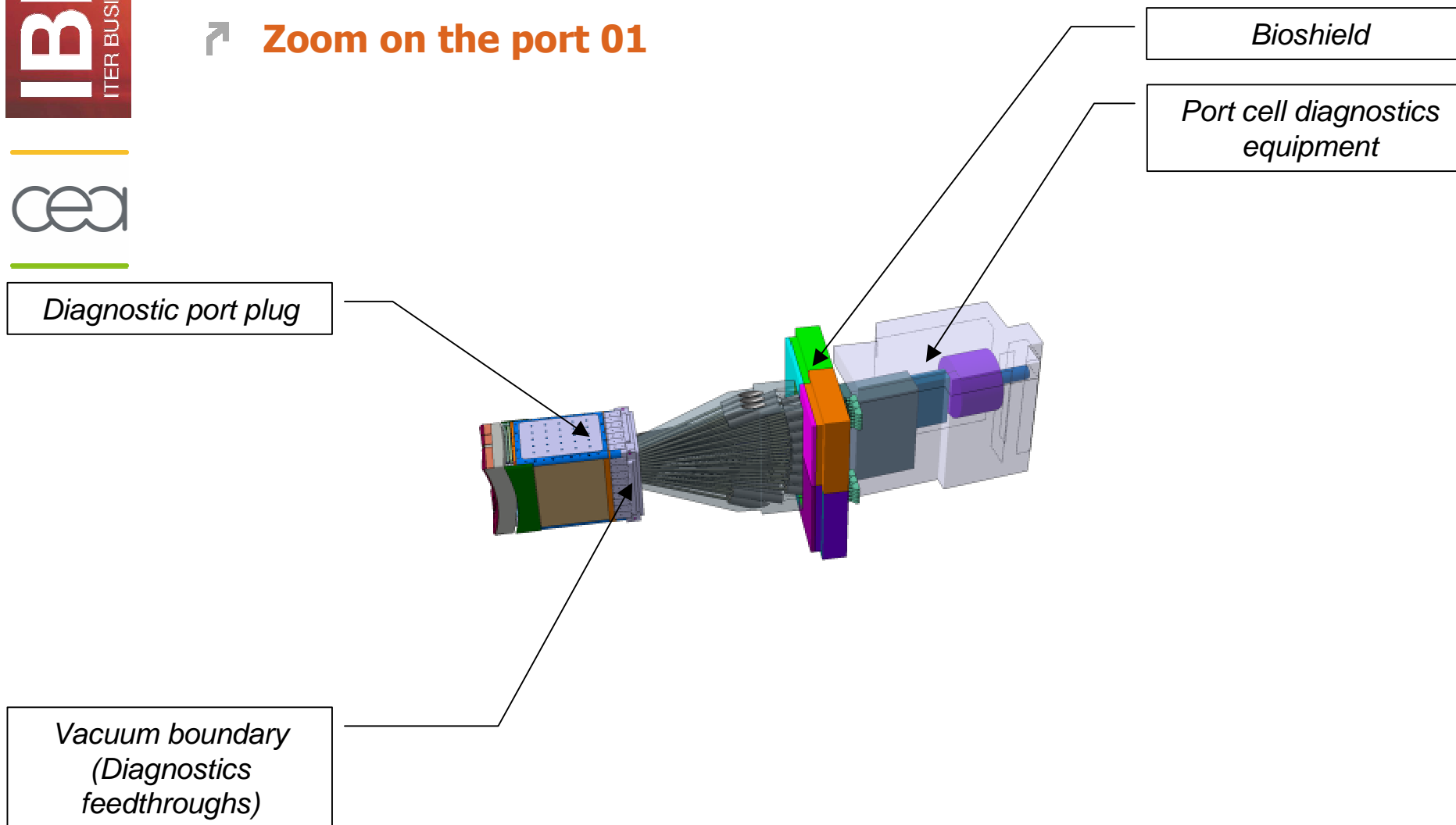
↗ **Zoom on the port 01**



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### Description of the Diagnostic Equatorial Port Plug 01

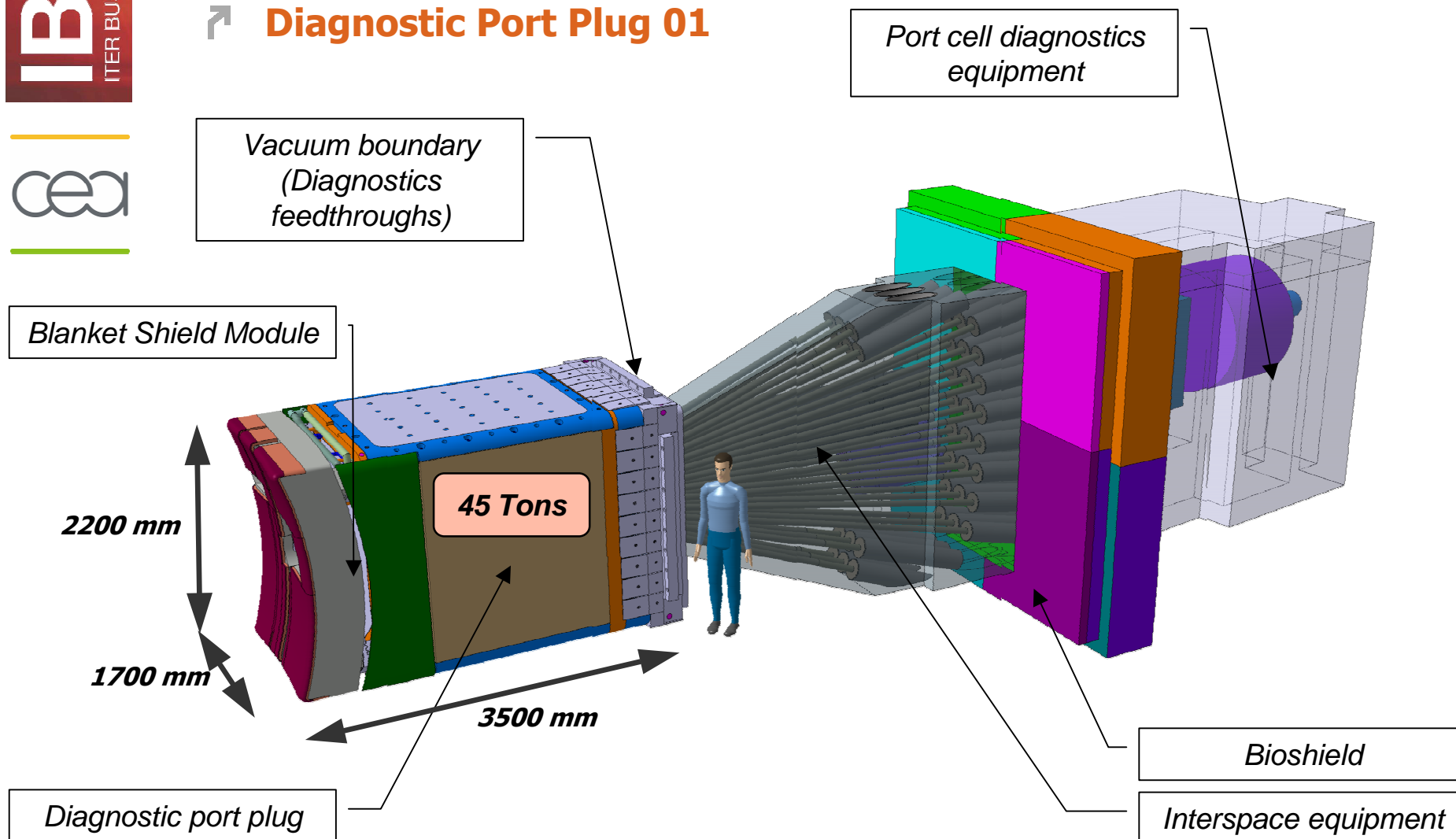
➤ **Zoom on the port 01**



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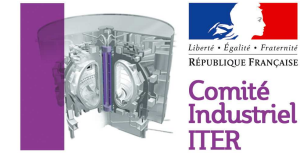
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#### Diagnostic Port Plug 01

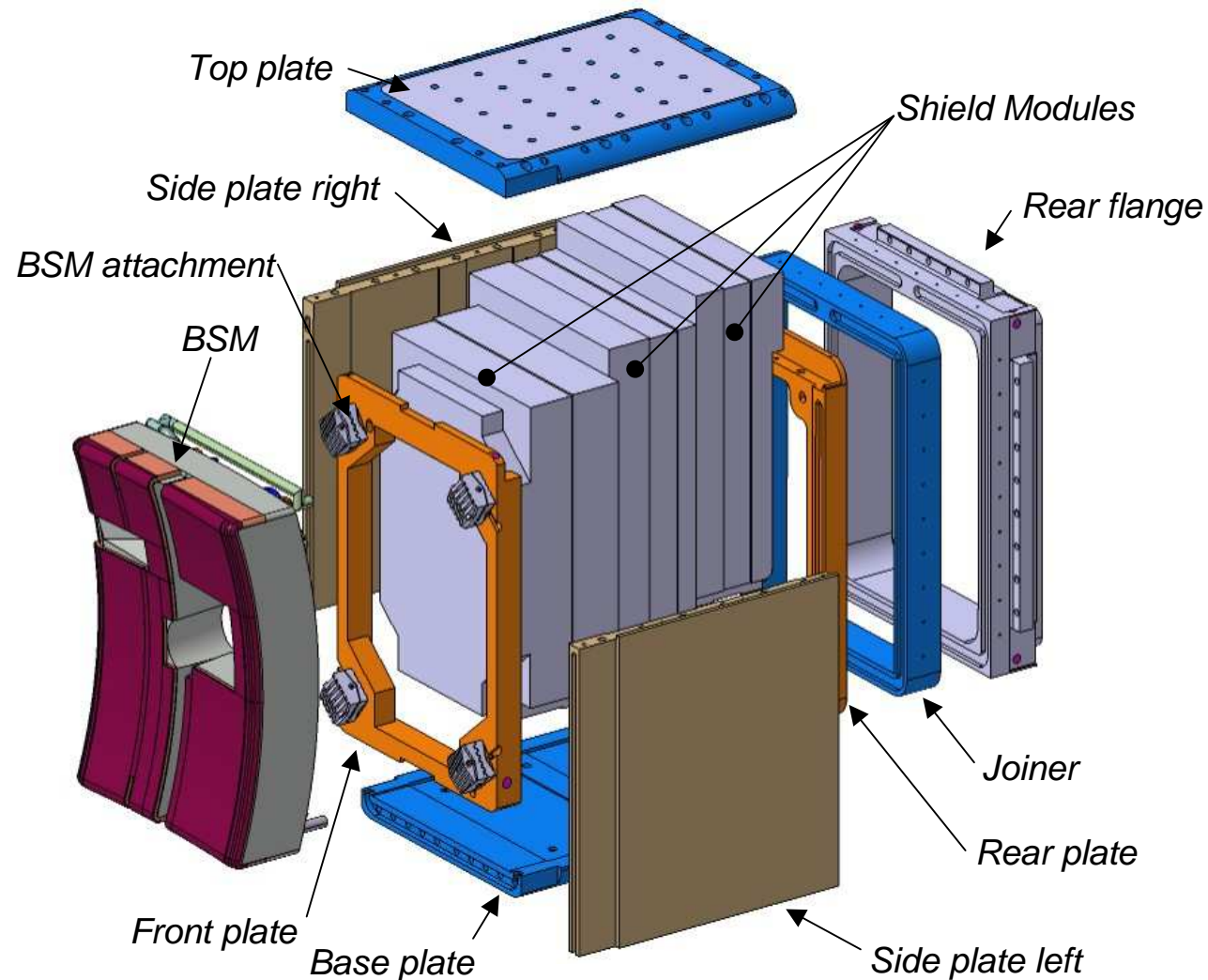


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### Description of the Diagnostic Equatorial Port Plug 01



#### Port Plug 01 frame structure and shields

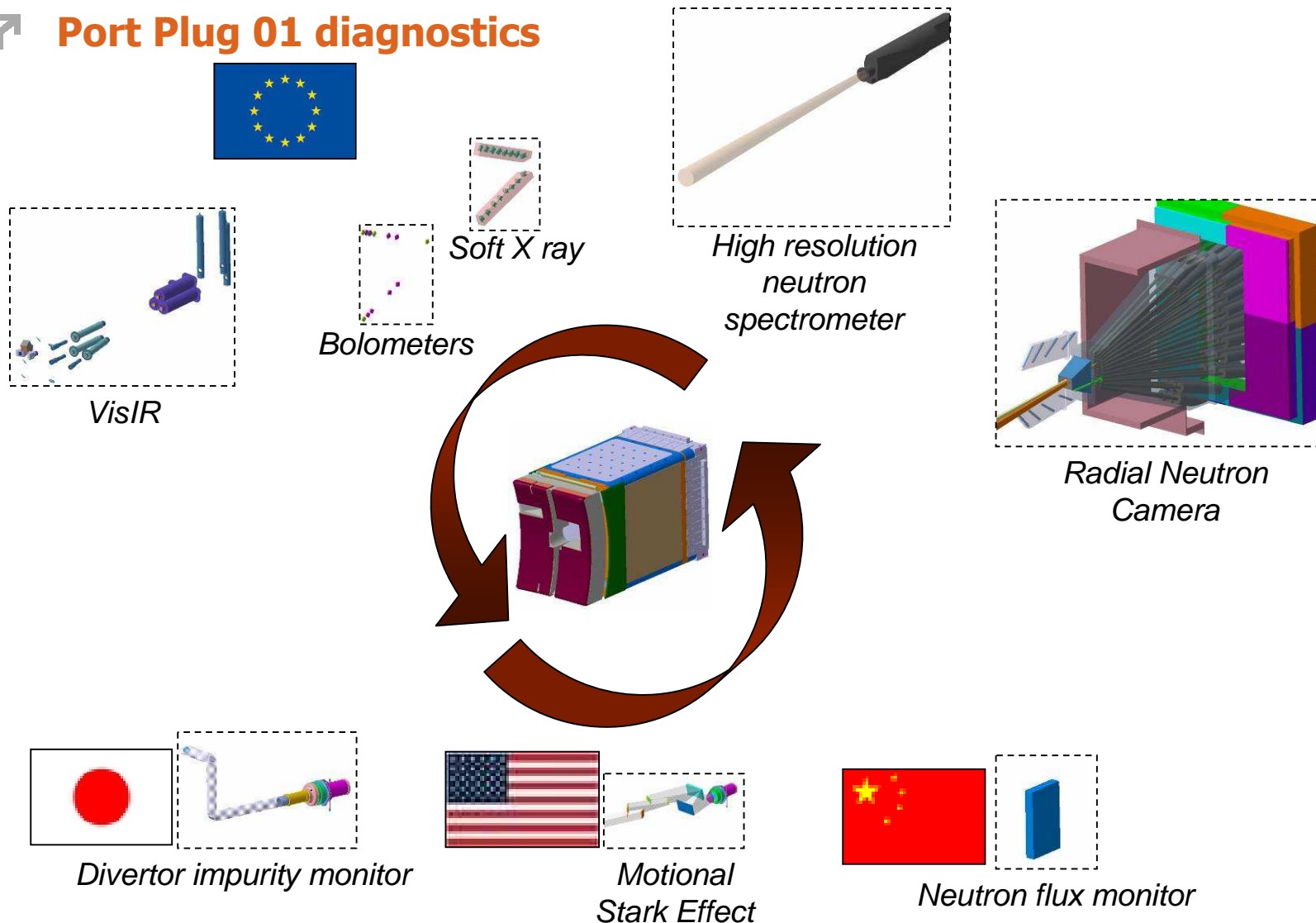


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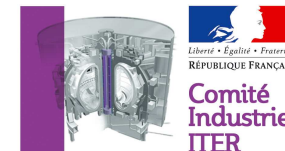
### Description of the Diagnostic Equatorial Port Plug 01



#### Port Plug 01 diagnostics



# Overview of « Equatorial Port Plug 01 » assembly



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- General layout of the ITER tokamak
- Description of the Equatorial Port Plug 01



## Assembly phases along the project

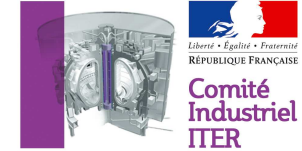
- Before final installation in tokamak
- Installation in ITER and lifecycle



## Conclusion

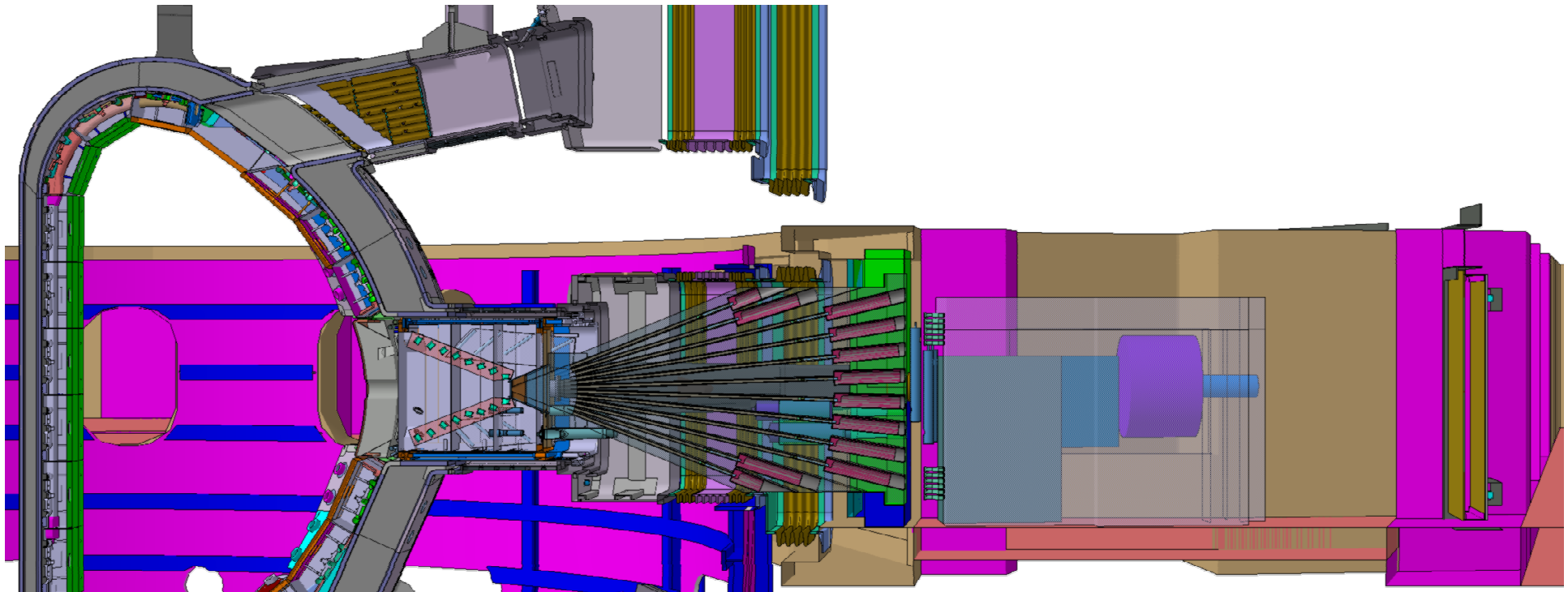


## Assembly phases along the project Before final installation in tokamak



### ↑ Design - virtual assembly

- Collaborative design
- Management of the interfaces
- Standardization of the assembly features
- Compatible with ITER tools
- Assembly techniques must be compliant with vacuum & safety requirements

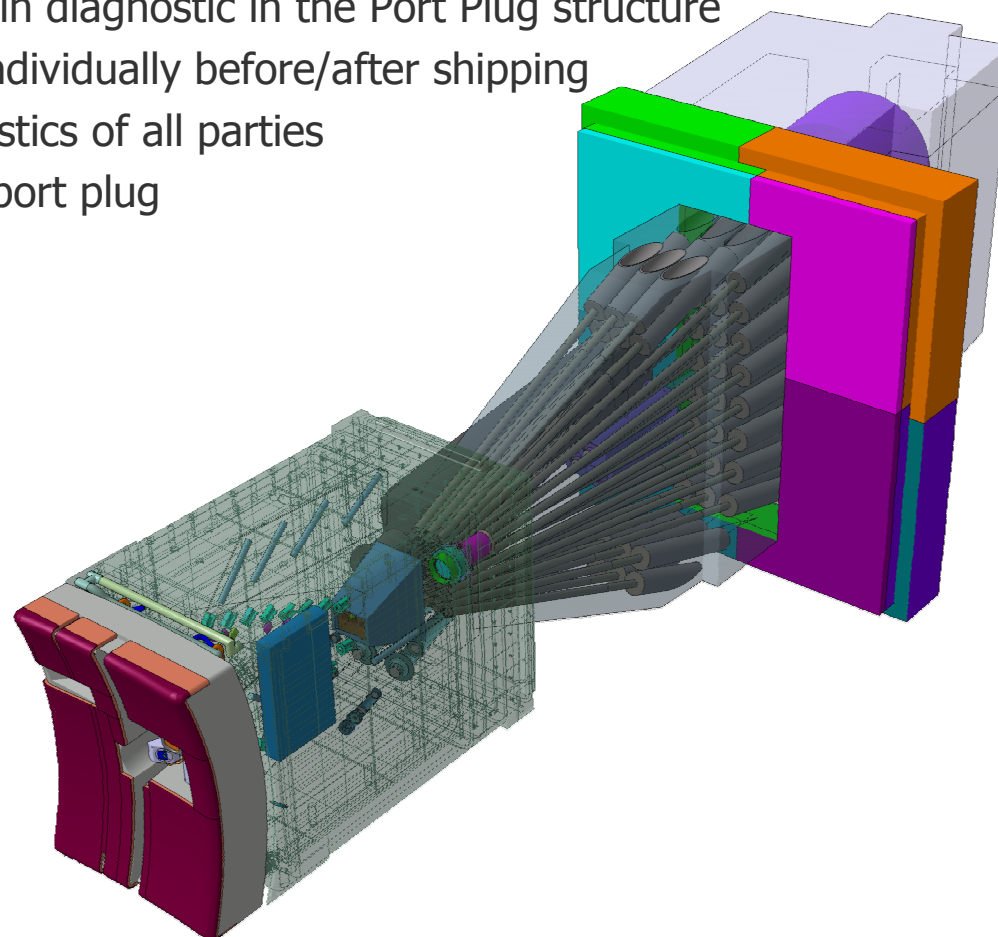


## Assembly phases along the project Before final installation in tokamak



### ↑ Assembly on supplier(s) site

- Assembly shall be done in suitable clean conditions (vacuum relevant)
- For each diagnostic, first assembly in host association/country
- Pre-integration of the main diagnostic in the Port Plug structure
- Test of each diagnostic individually before/after shipping
- Installation of the diagnostics of all parties
- Test/check of the whole port plug
- Final shipping to ITER





## Assembly phases along the project Installation in ITER and lifecycle



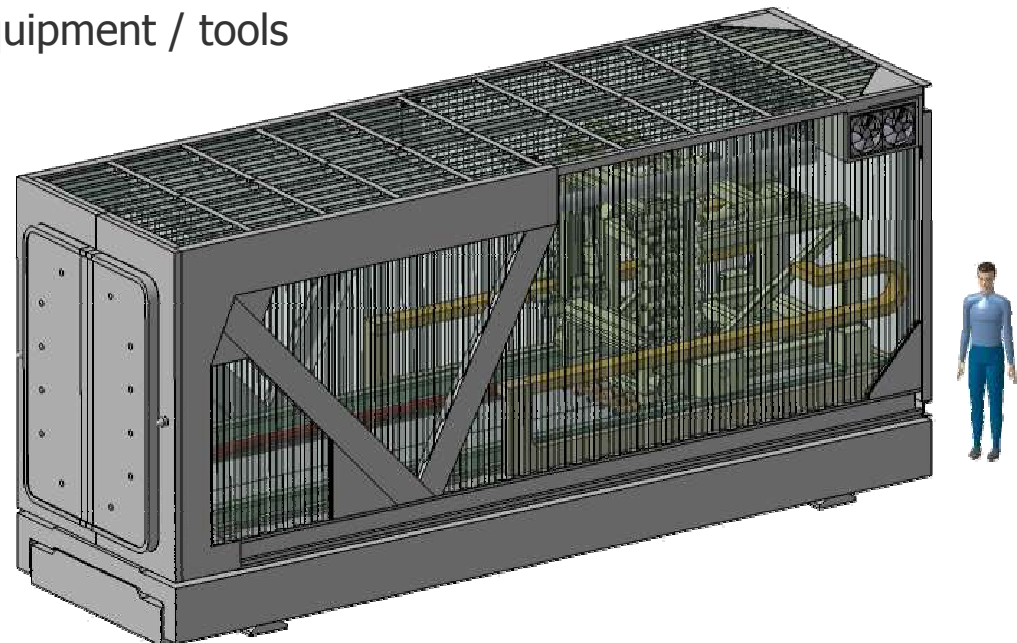
### Installation on site

- Transfer of the responsibility from supplier to ITER
- Connection of the Blanket Shield Module
- Calibration/check on site

### Maintenance

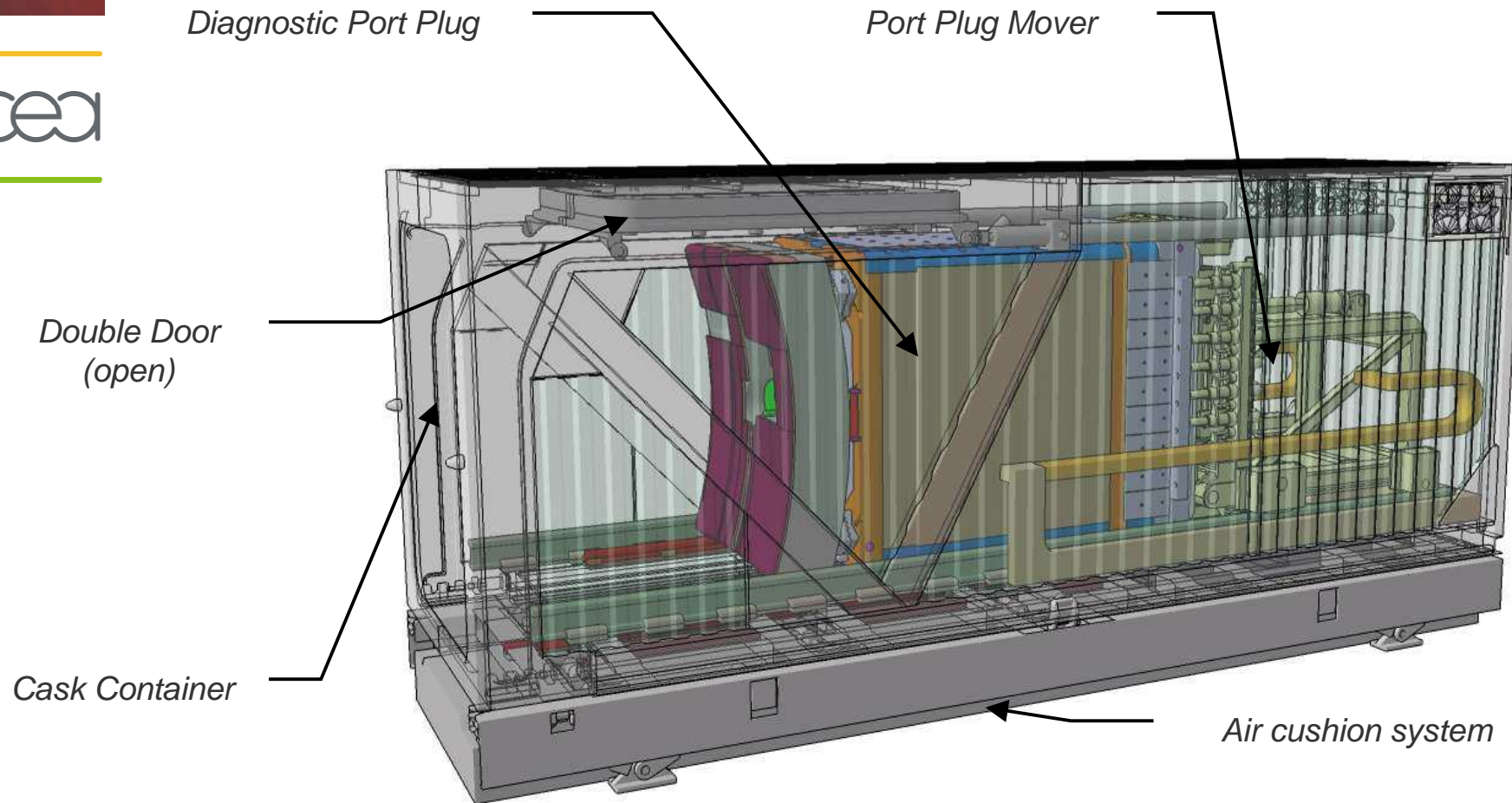
- Class 2 component : Components that do not require scheduled maintenance but are likely to require unscheduled or very infrequent remote maintenance
- Special maintenance equipment / tools

Equatorial Transfer  
Cask System



## Assembly phases along the project Installation in ITER and lifecycle

### ↗ Maintenance / Assembly tools



**TRANSFER PROCEDURE**

## Conclusion



- **The port plug is one significant example of the ITER project's major components for its strong collaboration aspects**
  - **Several diagnostics will be built and preliminarily mounted in different countries around the world; all must match in the same structure**
  - **A diagnostic port plug is a huge component that requires a high accuracy of manufacturing and assembly**
  - **The assembly phases must be carried out in suitable clean conditions compatible with vacuum and safety**
  - **Part of the assembly techniques must be compatible with remote operations for maintenance phases**
- ***All these stringent assembly conditions will require an important support from industry's knowledge and experience***



**Thank you for attending !**

